

Adaptive Venturi for Monopropellant Feed Systems, Phase I

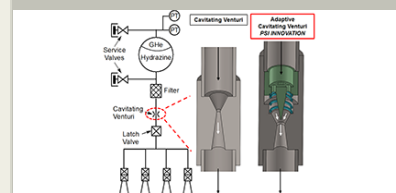
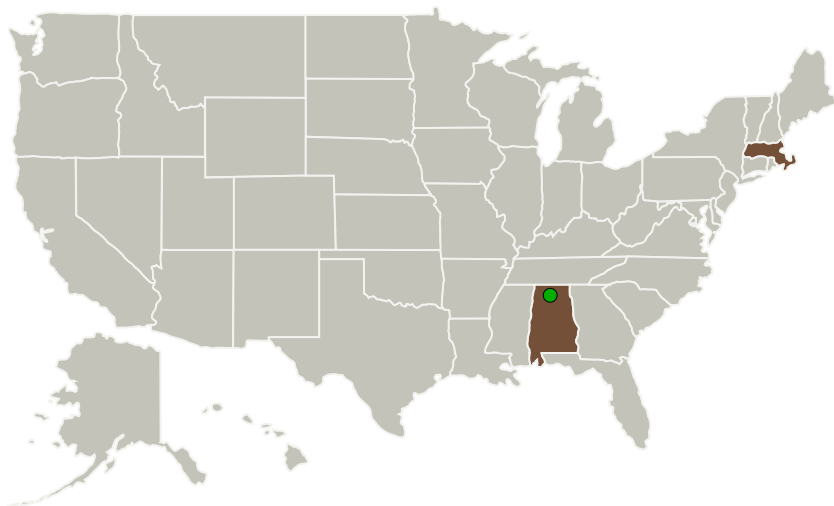
Completed Technology Project (2017 - 2017)



Project Introduction

Physical Sciences Inc. proposes to develop a unique venturi for future monopropellant feed systems that uses a passively controlled throat area to adjust propellant flow rate. The adaptive venturi eliminates water hammer in monopropellant thruster manifolds by rapidly adjusting flow area to prevent pressure surges. These benefits are achieved with a one-to-one replacement of existing cavitating venturis without added weight, volume, or power requirements. Furthermore, the total lifetime impulse of the propulsion system will increase due to increased flow area during nominal flow conditions. In Phase I, we will optimize the venturi design and measure key performance metrics in full-scale flow tests. The Phase I will conclude with a miniaturized adaptive venturi design accompanied by performance analysis results. In Phase II, a set of geometric models will be created to meet the range of flow conditions required for attitude and reaction control thrusters, as well as divert/insert thrusters up to 100 lbf. Upon successful technology development under the SBIR program, protoflight components and venturis for ground testing will be developed in technology transition programs.

Primary U.S. Work Locations and Key Partners



Adaptive Venturi for Monopropellant Feed Systems, Phase I Briefing Chart Image

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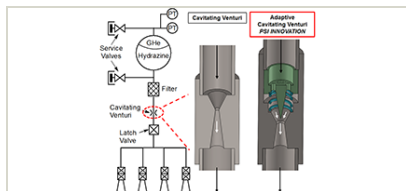


Organizations Performing Work	Role	Type	Location
Physical Sciences, Inc.	Lead Organization	Industry	Andover, Massachusetts
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations

Alabama	Massachusetts
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Images



Briefing Chart Image

Adaptive Venturi for Monopropellant Feed Systems, Phase I Briefing Chart Image
(<https://techport.nasa.gov/image/130277>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Physical Sciences, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

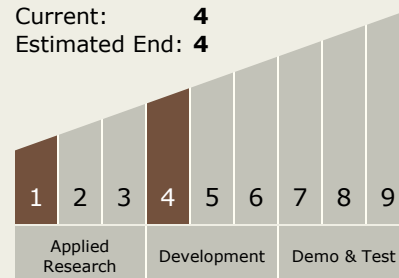
Carlos Torrez

Principal Investigator:

Jeffrey L Wegener

Technology Maturity (TRL)

Start: 1
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.1 Chemical Space Propulsion
 - └ TX01.1.2 Earth Storable

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System